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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/532,473	04/22/2005	Kunhiro Oda	OGOSH31USA	1626
270 7590 09/23/2008 HOWSON AND HOWSON SUITE 210 501 OFFICE CENTER DRIVE FT WASHINGTON, PA 19034			EXAMINER ROE, JESSEE RANDALL	
			ART UNIT 1793	PAPER NUMBER
			MAIL DATE 09/23/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/532,473

**Applicant(s)**

ODA, KUNIHIO

**Examiner**

Jessee Roe

**Art Unit**

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2, 12-15, 17-19 and 30-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2, 12-15, 17-19 and 30-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/08)  
Paper No(s)/Mail Date 2 July 2008
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of the Claims***

Claims 2, 12-15, 17-19 and 30-33 are pending wherein claims 2, 12, 15 and 19 are amended, claims 30-33 are new, and claims 1, 3-11, 16 and 20-29 are canceled.

### ***Status of Previous Objections***

The previous objection to claim 15 for informalities is withdrawn in view of the Applicant's amendment to the claim.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 12-15, 17-19 and 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner (US 6,331,233).

In regards to claims 2, 12-14 and 17-18, Turner ('233) discloses a method of manufacturing tantalum sputtering targets wherein vacuum-melted tantalum ingots would be forged, rolled and annealed at a temperature in the range of 1500°F to 2800°F (1089K to 1811K) (col. 3, line 49 – col. 4, line 26). Turner ('233) further discloses annealing in an inert atmosphere at a temperature in the range of 1500°F to 2800°F (1089K to 1811K) to recrystallize the microstructure; utilizing at least three deformation

steps and no less than three inert-atmosphere steps from ingot to final target plate thickness to achieve a mean grain size of less than 100  $\mu\text{m}$  and less than about 50  $\mu\text{m}$  (Figure 3 and col. 3, line 49 – col. 4, line 26).

The Examiner notes that the temperatures of deformation and annealing in addition to the resulting sputtering plate grain size disclosed by Turner ('233) overlap the temperatures of deformation and annealing and resulting sputtering plate grain size of the instant invention, which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed temperatures of deformation and grain sizes from the temperatures of deformation and grain sizes disclosed by Turner ('233) because Turner ('233) discloses the same utility throughout the disclosed ranges.

In regards to claims 15 and 19, Turner ('233) discloses texture uniformity throughout the thickness of the plate (Example 1) and a process that would be the same as or similar to that of the instant invention. Therefore, a target with no uneven macrostructure in the form of streaks or aggregates on the surface or inside the target would be expected. MPEP 2112.01 I.

Claims 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Michaluk et al. (US 6,348,113).

In regards to claim 30, Michaluk et al. ('113) discloses processing of tantalum to form sputtering targets (col. 3, lines 10-45). Michaluk et al. ('113) further discloses crystallizing a liquid to form potassium fluoride salt; recovering tantalum powder from

the salt; electron beam melting the recovered tantalum powder to further remove impurities; performing flat forging; annealing in vacuum to achieve at least partial recrystallization; performing warm or cold rolling; and then final annealing at a temperature and time effective to produce a final grain size of less than 50  $\mu\text{m}$  (abstract, col. 5, line 60 – col. 6, line 10 and col. 7, lines 1-37). Michaluk et al. ('113) further discloses that the first annealing step would be at a temperature in the range of about 950°C to about 1500°C (col. 7, lines 30-37) and that the final annealing step would be at a temperature in the range of 950°C to 1150°C (Example 3).

The Examiner notes that the temperatures of deformation and annealing in addition to the resulting sputtering plate grain size disclosed by Michaluk et al. ('113) overlap the temperatures of deformation and annealing and resulting sputtering plate grain size of the instant invention, which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed temperatures of deformation and grain sizes from the temperatures of deformation and grain sizes disclosed by Michaluk et al. ('113) because Michaluk et al. ('113) discloses the same utility throughout the disclosed ranges.

With respect to the recitation “forming a Ta ingot or billet by melting and casting a Ta raw material having a purity of 4N5 (99.995%) or greater” as recited in lines 3-4 of claim 30, the Examiner notes that although Michaluk et al. ('113) discloses that the purity of the tantalum would typically be between 99.50 and 99.99%, the Examiner asserts that the melting and casting technique as disclosed by Michaluk et al. ('113)

would also be applicable to a tantalum material having a purity of 99.995%. Also, Example 1 teaches a tantalum raw material having 99.999% purity.

With respect to the recitation "the target being made to have no uneven macrostructure in the form of streaks or aggregates on a surface of the target and inside the target" as recited in lines 12-14 of claim 30, Michaluk et al. ('113) discloses a fine grain structure and a uniform texture (col. 1, lines 58-60) and that a uniform texture (i.e. no unevenness in the structure) (col. 1, lines 38-55).

In regards to claims 31-33, Michaluk et al. ('113) discloses previous steps of round forging and annealing at a temperature in the range of about 900°C to about 1200°C (about 1173K to about 1473K), which overlaps the ranges of 1373K to 1673K and recrystallization annealing at 1173K as instantly claimed.

### ***Response to Arguments***

Applicant's arguments filed 2 July 2008 have been fully considered but they are not persuasive.

First, the Applicant primarily argues that claim 2 requires that an ingot be forged and then annealed at a temperature of 1373K to 1673K, and that this set of steps is required to be performed twice during the claimed process and that claim 2 requires that after one of these sets that the ingot be forged or rolled and then annealed at a temperature between recrystallization starting temperature and 1373K (a different and lower temperature).

In response, the Examiner notes that Turner ('233) discloses a method of manufacturing tantalum sputtering targets wherein vacuum-melted tantalum ingots

would be forged, rolled and annealed at a temperature in the range of 1500°F to 2800°F (1089K to 1811K) wherein there would be at least three deformation steps and no less than three inert-atmosphere steps from ingot to final target plate thickness to achieve a mean grain size of less than 100  $\mu\text{m}$  and less than about 50  $\mu\text{m}$  (Figure 3 and col. 3, line 49 – col. 4, line 26). The Examiner further notes that the temperature range of Turner ('233) encompasses the temperature range of the instant invention. Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. MPEP 2144.05 II.

Second, the Applicant primarily argues that the cited prior art reference Turner ('233) requires a minimum of three stages each of which includes a deformation step followed by an inert atmosphere high-temperature anneal and the high-temperature anneal steps are stated as being preferably between 2200°F and 2400°F (1477K to 1589K).

In response, the Examiner notes that broader disclosure teaches a range of 1500°F and 2800°F (1089K to 1811K) (col. 4, lines 1-15). Preferred embodiments do not constitute a teaching away from a broader disclosure or non-preferred embodiments. MPEP 2123 II.

Third, the Applicant primarily argues that if at three or more annealing process steps are performed at a high temperature as taught by Turner ('233), excessive grain growth will occur during recrystallization which will result in the formation of coarse crystals, or since a part of the structure may show abnormal grain growth, a uniform and

fine structure cannot be obtained.

In response, the Examiner notes that Turner ('233) discloses a uniform texture throughout the thickness of the target with no banding (Example 1). Thus, the Applicant's arguments appear to contradict the teachings of Turner ('233). Furthermore, Turner ('233) discloses a process that is the same as or substantially similar to the process of manufacturing a tantalum sputtering target as instantly claimed. Therefore, a uniform and fine structure would be expected. MPEP 2112.01 I.

Fourth, the Applicant primarily argues that in order to form a structure in which the desired orientation spreads out in a disk shape (or convex lens) shape toward the center of the target, cross rolling is required and the crystal orientation disclosed by Turner ('233) cannot be obtained without cross rolling; the instant invention does not relate to controlling orientation; and the instant invention is unrelated to the technology of controlling the structure of the orientation in the thickness direction. The Applicant further argues that there are significant differences between the target obtained by Turner ('233) and that obtained by the instant invention and it is incorrect to assume that a target having no uneven macrostructure in the form of streaks and aggregates on the surface or inside the target would be obtained or would be expected to be obtained by the process disclosed by Turner ('233).

In response, the Examiner first notes that the instant claims do not preclude cross rolling as the rolling claimed in the instant invention. Further, the Examiner notes that the both the instant invention and Turner ('233) are directed towards methods of processing tantalum sputtering targets. Therefore, the instant invention and Turner



('233) would be directed to related technology. Second, the Examiner notes that the Applicant has not provided any technical evidence to support the conclusion that the properties of the sputtering target of the instant invention would be distinct relative to the properties of the sputtering target obtained by the cross rolling disclosed by Turner ('233).

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John P. Sheehan/  
Primary Examiner, Art Unit 1793

JR

**Application Number****Application/Control No.**

10/532,473

**Examiner**

Jessee Roe

**Applicant(s)/Patent under  
Reexamination**

ODA, KUNIHIRO

**Art Unit**

1793